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Mental Health Patterns and Consequences:

Results from Survey Data in Five Developing Countries

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Abstract

The social and economic consequences of poor mental health in the developing world are presumed to be significant, yet are largely under-researched. The authors argue that mental health modules can be meaningfully added to multi-purpose household surveys in developing countries, and used to investigate this relationship. Data from nationally representative surveys in Bosnia and Herzegovina, Indonesia, and Mexico, along with special surveys from India and Tonga, show similar patterns of association between mental health and socioeconomic characteristics across countries. Individuals who are older, female, widowed, and report poor physical health are more likely to report worse mental health outcomes. Individuals living with others with poor mental health are also significantly more likely to report worse mental health themselves. In contrast, there is little observed relationship between mental health and poverty or education, common measures of socio-economic status. The results instead suggest that economic and multi-dimensional shocks such as illness or crisis can have a greater impact on mental health than overall levels of poverty. This may have important implications for social protection policy. The authors also find significant associations between poor mental health and lowered labor force participation (especially for women) and higher frequency visits to health centers, suggesting that poor mental health can have significant economic consequences for households and the health system. Finally, the paper discusses how measures of mental health are distinct from general subjective welfare measures such as happiness and indicate useful directions of future research.

This paper—a product of the Research Department—is part of a larger effort in the department to look at the determinants of mental health status in developing context. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The author may be contacted at edecastro@worldbank.org.

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1. Introduction

Following the World Health Organization's flagship report (WHO 2001), mental health is receiving increased attention in public health and policy spheres. According to widely circulated global burden estimates, unipolar depressive disorders are the leading cause of disability adjusted life-years (DALYs) in the Americas and the third leading cause in Europe, but they also rank highly in lower income countries. For instance they are the second leading cause in the Western Pacific, the fourth leading cause in South-East Asia and the fifth leading cause in the Eastern Mediterranean (Ustun et al., 2004).[1] While depression is not in top ten causes of DALYs in Africa, it is recognized as major source of disability particularly in conjunction with the HIV/AIDS epidemic (Freeman et al., 2005). The relatively few low-income country estimates of poor psychological health suggest that prevalence levels are not systematically lower than those found in wealthier countries (Bijl et al. 2003). The lifetime prevalence of psychiatric morbidity in rural Ethiopia was found to be 31.8 percent (Awas et al., 1999); a community survey of 1,454 adults in Sao Paulo, Brazil found a lifetime prevalence for any disorder of 45.9 percent (Andrade et al., 2002); and a review of 5 prevalence studies in 4 countries undergoing rapid socioeconomic change found lifetime prevalence rates of common mental disorders ranging from 23 percent in Pelotas, Brazil to 46 percent in Goa, India (Patel et al., 1999).

An economist's viewpoint adds to this literature in two different ways. First, there are increasing calls for broadening the concept of well-being to include other markers of "human development" besides income or consumption-based measures. Mental health could well be an important new addition, as poor mental health directly affects well-being. Understanding how (and if) mental health indicators can be collected in the context of large-scale household surveys is thus important. Second, the *impact* of mental health on economic behavior is of inherent interest. To the extent that mental health affects labor force participation or productivity, there may be a direct economic rationale for public investments in improving mental health.

Incorporating mental health measures in household surveys would extend current social science research on health, which attempts to understand the interrelations between poor physical health and economic and social outcomes (e.g. Strauss and Thomas, 1998). The consequences of mental disorders such as depression and anxiety are presumed to be significant yet are largely under-researched in low-income countries. A comparative research project of the World Bank's Development Research Group attempted to address this knowledge gap by investigating the socio-economic context of poor mental health in low

[1] Such statements should be treated with caution given the sparse data on both physical and mental health available in many countries in these regions.

and middle-income countries. The research produced 3 country studies from Tonga, India, and Indonesia (Stillman et al., 2007; Das and Das, 2007; Friedman and Thomas, 2007) and uses data from these countries as well as Mexico and Bosnia and Herzegovina (hereafter BiH) to study the correlates of mental health in a broad variety of low-income country settings.

This overview serves several purposes. First, it argues that including mental health modules in multi-purpose household surveys is relatively straight-forward and informative in that they capture "real" underlying psychological morbidity. Validation studies from the Indian and BiH datasets used here show that the mental health measures collected from surveys are highly correlated with clinical diagnosis of psychiatric disorders such as depression. Additionally, across all five countries, we find similar associations between mental health and a number of socio-demographic correlates, suggesting stability in what is being measured. Secondly, this review shows that mental health status is associated with labor supply and health care utilization, conditional on self-reported physical health status and other socioeconomic variables commonly collected in household surveys.

Two additional findings suggest that mental health can be a complementary source of information to traditional welfare measures such as income, consumption, or poverty. In contrast to studies in high-income countries, we do not find a strong correlation between levels of income or consumption and mental health. While poor mental health is not a "disease of affluence" in the developing world, neither is it a disease of poverty. On the other hand, the country specific case studies in the comparative research project show that individuals' responses to long-term or short-term shocks differ noticeably whether one looks at monetary based measures of welfare such as income and consumption, or mental health indicators.

The remainder of the paper is structured as follows. Section 2 describes the survey instruments used to measure mental health and their validation. Section 3 examines the association between mental health and potential individual and household predictors, while Section 4 considers the relationship between mental health and two behavioral outcomes: labor supply and health-care utilization. Section 5 reviews the implications of these findings and contrasts them with the happiness literature, discusses potential response biases arising from self-reported mental health measures and how these may affect our findings, and suggests probable productive paths of future research.

2. Data: Measuring Mental Health in Multi-purpose Household Surveys

The psychological health literature has used two approaches to measure mental distress through surveys. The first approach attempts to diagnose specific psychiatric illnesses with symptom data collected through survey interviews. The most widely used form of this approach is the Composite International Diagnostic Interview (CIDI) in its various formats, translations, and revisions. A second approach in low income countries is the use of instruments intended to measure general psychological distress, rather than diagnose specific manifestations of mental illness per se. Common examples include variants of the General Health Questionnaire (GHQ) of Goldberg (1972) and the Mental Health Inventory (MHI-5) of Veit and Ware (1983). These measures have been found to perform well in a number of settings in detecting major depression, general affective disorders and anxiety disorders (Berwick et al. 1991, McCabe et al. 1996). However, both approaches have found large differences in the overall case prevalence and proportion of respondents answering "yes" to specific questions across countries, which has been ascribed in part to differences in cultural norms related to disease attribution and the stigma of mental illness (Patel et al., 1998; Aidoo and Harpham, 2001; Cross-National Collaborative Group, 1992; WHO International Consortium in Psychiatric Epidemiology, 2000; Demyttenaere et al., 2004).

The multipurpose surveys used in this paper follow the second approach, each fielding a widely-used mental health screening instrument in the context of general household surveys. Table 1 summarizes the survey year, geographic coverage, mental health instrument, and sample size in each country. Nationally (or near-nationally) representative surveys of over 10,000 households were carried out in Mexico and Indonesia, each using a variant of the GHQ to measure mental health. A nationally representative survey of over 5,400 households in BiH used the Center for Epidemiological Studies Depression Scale (CESD) of Radloff (1977), a 20-question self-reported depression scale. We also use two smaller special purpose surveys. The first are data from a longitudinal study of 300 households in Delhi, India, which do not differ in observable characteristics from a representative sample of households in this city (Das and Sanchez, 2003). This survey uses the most comprehensive mental health instrument, the 90-question Symptom Checklist 90 Revised (SCL-90R). The second special survey is a survey of 230 Tongan households taken from villages in which some individuals had applied for an emigration lottery (Stillman et al. 2006), which used the MHI-5 to measure mental health.

The data assembled here offer several advantages over those used in many previous studies. First, the surveys sample households from a population representative frame, whereas several existing studies sample opportunistically, such as patients at health clinics (e.g. Patel et al. 1998), with possible biases arising from non-random utilization of health clinics. Second, surveying households rather than

individuals allows examination of the concordance of mental health outcomes among different members of the same household. Third, the comprehensive multipurpose nature of the surveys provide richer measures of socioeconomic characteristics, including expenditure or income-based measures of poverty, rather than more blunt indicators such as earning less than one-quarter the minimum wage, or the presence or absence of electricity and tap water (e.g. Patel and Kleinman, 2003). Finally, we also able to link mental health with behaviors in the labor and health care markets.

While the exact content of the mental health questionnaires vary across the different countries, they are similar in concept. Typical questions ask respondents the frequency in the last month of a similar range of internal states (e.g. "feeling sad or blue", "feeling anxious or nervous") or related behaviors (e.g. "difficulty falling asleep", "distracted from everyday activities"). The frequency of such states or behaviors is recorded on a four-point scale that ranges from "never" or "almost never" to "very often". In line with the standard analysis of the GHQ and MHI-5, we score the individual's survey response by assigning a low ordinal value (1 point) to categorical responses of infrequency and high ordinal values (up to 4 points) to the most frequent categories.[2] The average response across all questions (with each question given equal weight) constitutes the respondent's mental health score, often known as the Global Severity Index or GSI, which is higher for those reporting worse mental health. [3]

In contrast to subjective measures of well-being such as life-satisfaction, mental health measures can be validated against well-defined objectives – in particular, whether or not answers to the questions are predictive of clinical diagnoses of depression, anxiety, and other mental health disorders. Both the GHQ and MHI-5 have been found to perform well in this regard. Attempts to validate the mental health modules with regards to the specific populations used in our studies were carried out for the India and BiH data. In BiH, a selected sample of individuals were administered the household survey module, and then examined by a psychiatrist for known psychiatric disorders. In India, survey teams administered the survey to 38 individuals seeking outpatient treatment at two psychiatric facilities and found the mental health scores to be significantly lower for the general population than for the selected sub-population known to suffer from psychiatric disorders. In BiH the validation relied on a sample of 184 patients who

[2] The MHI-5 used in Tonga had a 5-point scale while the GHQ adapted in Indonesia had a 3-point scale. Both were standardized to a 1 to 4 range for Table 1.

[3] In addition, for each country except Tonga there are three common questions, which ask whether the respondent has recently felt sad, felt anxious, and had trouble sleeping. An index formed using only these three questions has correlations of 0.84-0.90 with the overall index for each country, and similar results are obtained using this less comprehensive measure. In order to include Tonga in the analysis and use the indices most commonly employed in practice, we analyze the more comprehensive measures.

visited primary health care facilities in the Canton of Middle Bosnia. The household survey is found to have 97.5 percent sensitivity and 75 percent specificity rates (Kapetanovic, 2004). [4]

Table 1 presents the mean and standard deviation of the raw scores by country. Given the aforementioned concerns with cross-national comparability, this overview does not directly compare levels of psychological distress across the different national surveys, but rather explores the observed commonalities and differences in correlates of mental health. To do this, we standardize the mental health scores by subtracting the country mean and dividing by the country standard deviation. The standardized GSI then has a mean of zero and a standard deviation of one within each country.

3. Characteristics of Those with Poor Mental Health – Patterns and Divergences

This section summarizes and extends the work in Das et al. (2007), examining the correlation of mental health status with individual, household, and community-level factors. We identify demographic and socioeconomic characteristics that could be consistently measured across the different datasets and that the existing literature has found to be associated with mental health. These include age, gender, marital status, physical health, and education. We add to this household measures of expenditure (or income in the case of Tonga), household size, and the average mental health of other household members. For the three large surveys, we additionally include community-level mental health scores, which are the average mental health of other households in the community.[5]

3.1 Mental health in the cross-section

Table 2 reports the results of ordinary least squares regressions of the standardized mental health scores on these characteristics, where analysis is restricted to 15-80 year olds and standard errors are clustered at the household level. A possible concern is that much of the linear association between mental health scores and the covariates is driven by differences between individuals with very good compared to average mental health, thus masking important heterogeneity relevant to those with the highest mental health scores (presumably those in greatest need of treatment). In Table 3 we therefore report marginal effects from probit estimation of the probability of an individual being in the worst 10% or worst 5% of

[4]Although these results are promising for the relevance of household survey modules to assess mental health distress, validation exercises are made on a sample of individuals that might differ significantly from the larger population of interest. Field validations undertaken in future related studies may address this concern.

[5] We have also experimented with community fixed effects to control for unobserved community factors. The main results do not change appreciably with the inclusion of fixed effects and so we do not report those results here.

mental health scores in each country—typically referred to as the "caseness" category in the psychology literature.[6]

The results of both the OLS and probit estimations confirm widely reported associations across countries between demographic and household factors with mental health status across countries, albeit with some exceptions. Consistent with the existing literature (e.g. Awas et al. 1999, Andrews et al. 2001), in all five countries we find a tendency of mental health to worsen with age, with this effect significant in all countries except Tonga.[7] A second common regularity in the literature is a tendency for females to have worse mental health (Awas et al. 1999, Kessler et al. 2005). This is found to be the case in four out of the five countries, with the effect strongest in Mexico, where females are 8 percentage points more likely to be in the worst 10% of mental health scores. Tonga is again the exception, where females have significantly better mental health in the OLS regression. However, much of this appears driven by sub-clinical differences, since the probit results show a small and insignificant effect of being female.

A third consistent finding in the literature is that respondents who are separated, divorced or widowed report worse mental health compared to those who are married (Andrade et al., 2002; Andrews et al., 2001; Kessler et al., 2005; Weissman et al., 1996). This is found to be the case here in all countries except India, where widows report significantly better mental health. This difference in India appears driven by differences among individuals with relatively good mental health, as the coefficient becomes smaller and insignificant when we examine the likelihood of being in the worst 10% of mental health scores. In addition, small sample sizes (4 percent or 69 individuals are widowed in the Indian data) merit some caution in interpreting this result. Our results are also consistent with previous studies that have highlighted the links between poor physical and poor mental health (Kessler et al. 1994, Bijl et al. 2003). We measure physical health as a binary variable based on self-assessed general health status, and find a

[6] Attempts to compare mental health prevalence across countries by the WHO International Consortium in Psychiatric Epidemiology (2000) yielded 12-month prevalence rates of 22.4% in Brazil, 12.6% in Mexico and 8.4% in Turkey. Taking the worst 10% and worst 5% as cut-offs therefore appears likely to include many individuals with diagnosable disorders. A more inclusive cut-off of 20% yields qualitatively similar results, as does a non-linear Box-Cox transformation of mental health.

[7] Das et al. (2007) carry out semi-parametric regressions to examine non-linearities in age and other covariates. There is slight evidence for a non-linear relationship between age and mental health in Tonga, with mental health falling and then improving with age, while all other countries and variables are linear. Adding a quadratic term in age to the OLS regression in Table 2 gives a p-value of 0.08. This quadratic relation appears to be driven by a few outliers, as the quadratic term becomes insignificant (p-value of 0.33) if we restrict the analysis to those aged 70 and younger. We therefore report only linear terms in this paper.

large and significant effect.[8] Individuals with poor physical health are between 10 percent (India) and 18 percent (Mexico) more likely to be in the worst 10% of mental health.

Less of a pattern is found with respect to household size and the presence of old and young dependents in the household. Individuals in larger households have marginally better mental health in BiH, with no significant relationship elsewhere. Elderly dependents in the household are associated with significantly better mental health in BiH and Tonga, but no significant relationship elsewhere, while the significant positive and negative associations with young dependents in the OLS results become less pronounced in the probit regressions.

While we find similar demographic patterns to the existing literature, the association between mental health and per-capita household expenditure is tenuous at best, in contrast to the view that poverty is strongly associated with mental health disorders (Patel and Kleinman, 2003). In the OLS results, only BiH and Tonga show a significant negative relationship between per-capita consumption and individual mental health. The effects are small in magnitude, and reduce considerably once we consider the probit results: A doubling of household PCE in BiH results in a 0.4 percentage point greater likelihood of an individual being in the worst 10% of mental health scores. There is a small significant negative gradient in Indonesia in the probit results for those in the worst 5% of mental health scores. The OLS results for Mexico, India, and Tonga actually show a slight positive gradient although this is not significant at conventional levels.[9]

The association between schooling and mental health is also small in magnitude. All five countries have a negative coefficient on years of schooling in the probit regressions. However, this is only significant at the 5 percent level in Mexico, where one additional year of schooling is associated with a 0.4 percentage point drop in the likelihood of being in the worst 10% of mental health scores, and in BiH where the equivalent association is a 0.08 percentage point drop. The OLS results show similarly small effects. The largest effect is in India, where those with high school education have a 0.15 standard deviation better mental health score than those with less than primary.

[8] No individuals reported themselves in poor physical health in the Tongan survey, and so we do not include this variable in the Tongan analysis.

[9] The lack of association between mental health and poverty is not a result of the household average mental health status capturing a poverty effect. We obtain similar results when the household average mental health is omitted from these regressions.

All five surveys measured mental health for multiple adults within the household, enabling us to examine the co-prevalence of mental health. There are several possible channels through which such a correlation may occur. It may reflect the effect of omitted household-level variables, such as household-specific shocks or lack of available health services. It could also reflect unobserved individual-level traits, if assortative mating leads those with poor mental health to marry and perhaps pass on genetic factors influencing mental health to other family members. However, it is also plausible that the relationship could be causal, whereby the presence of one household member with poor mental health creates a poor mental health environment for other household members, i.e. a "contagion" effect. Tables 2 and 3 show that there is indeed a strong and significant positive relationship between an individual's mental health and that of his or her family.[10] A one standard deviation change in the mental health of household members is associated with a 0.22 to 0.59 standard deviation change in own mental health.

Finally, in BiH, Mexico and Indonesia we are able to look at the relationship between individual mental health and the mental health of others in the surrounding community. We see that there is a significant and positive association, even after controlling for household average mental health, with the size of the coefficient up to twice that at the household level. Some of the explanations that account for the within-household clustering of poor (or good) mental health can also apply at the community level.

3.2 Mental health and shocks

The cross-sectional relationships examined above show no significant relationship between mental health and poverty, but do find strong clustering of mental health outcomes within households and, to a lesser extent, within communities. One potential interpretation of this intra-household clustering is that they reflect, in part, the effect of common household-level (or community-level) shocks. The three country-specific studies produced by the Development Research Group's comparative project provide detailed study of the impact of shocks on mental health, and provide some support for this interpretation. We summarize the three studies and their implications for the impact of shocks here.

Two of the papers demonstrate that shocks that involved large changes in income led to changes in mental health. Friedman and Thomas (2007) consider the impact of a negative shock, the Indonesian financial crisis, finding that the crisis worsened mental health of households, and more so for households that were more greatly affected by the crisis. Moreover, they find this effect persists up to three years after the onset

[10] The household level mental health measure is the average across household members (excluding the individual respondent). Similarly we can define the average community mental health score as the average across the community (excluding the household in question).

of crisis despite a rapid recovery in consumption and income to pre-crisis levels.[11] In contrast, Stillman et al. (2006) examine the effect of a positive shock, winning an emigration lottery allowing migration from Tonga to New Zealand. They find migration to result in large increases in income, and to improvements in the mental health of the migrating households.

Although the Indonesian and Tongan case-studies show that large shocks can have significant effects on mental health, the effect they find may only be in part due to changes in income. It is likely that the financial crisis led to many other covariate changes in household circumstances, including, for example, changing availability of community level public services or household dislocation as a result of migration. Similarly, the reduced form impact of migration on mental health potentially encompasses a host of other changes other than income to the individual, which the authors explore in their paper.

Using the well-documented difference in mental health scores between men and women as a motivating question, the Indian study is an attempt to isolate exactly how a specific shock affects mental health, although the authors make less progress in identifying a causal impact. Specifically, Das and Das (2007) show that the male-female differential in mental health scores is directly related to the number of pregnancies a women has lost, either due to abortions and miscarriages or due to child-death. In households where there are no such losses, there is no gender difference in reported mental health scores. This finding is puzzling and can be interpreted in a number of different ways. By combining the quantitative analysis with anthropological narratives, the authors present qualitative evidence on the pathways through which these data may be realized.

Taken together, the three case studies provide strong evidence that while income and poverty are not strong predictors of mental health status, shocks that affect the economic or demographic nature of the household may have significant *influences* on mental health. In the next section we turn to explore the possible *consequences* of poor mental health for economic behavior.

4. Possible Consequences of Poor Mental Health

The multi-purpose surveys enable us to examine associations between mental health and two development-related outcome measures--labor force participation and health care utilization. While we can not ascribe a causal effect to mental health (except under the strong condition of selection on observables), we view this as an exploratory step intended to show the extent to which poor mental health

[11] Related evidence is found in de Mel, McKenzie and Woodruff (2007), who show no relationship amongst mental health recovery from the tsunami in Sri Lanka and income recovery of microenterprise owners.

status is correlated with economic behavior and how these patterns may vary around the developing world.

4.1 Labor force participation

Labor force participation is an important determinant of socioeconomic welfare and many researchers observe a strong empirical association between mental illness and labor force participation in developed countries (Bjorklund, 1985; Ettner et al., 1997; Kessler et al., 1989; Dooley et al., 2000). The association between mental health status and labor force participation could reflect difficulties in finding and sustaining work for those with poor mental health, or depression and other mental health problems arising from lack of work.

Table 4 presents the marginal effect of mental health on labor supply from probit regressions. Panel A shows the effect when the standardized GSI is used as the measure of mental health status, while Panel B shows the effect of being in the worst 10% of mental health scores within a country. Estimation is restricted to 18 to 60 year olds, and is estimated separately by gender given gender differences in labor market behaviors.

Table 4 finds that the association between labor force participation and mental health status varies by gender and country. In both Mexico and BiH there is no significant association and the coefficients are small in magnitude. However both men and women exhibit significant albeit relatively slight associations in Indonesia. A one standard deviation improvement in mental health status increases the labor force participation by 1.3-1.7 percentage points, while individuals in the worst 10% of mental health scores have 4.6-5.1 percentage point lower participation rates. In India, there is no significant effect for men, whereas a very large effect for women. In the Indian sample, the labor force participation rate of women aged 18 to 60 is only 30.4%, so the 17.7 percentage point lower participation rate for women in the worst 10% of mental health scores cuts labor force participation in half. The Tongan results show a sizeable and significant negative effect of mental health on labor force participation for women when the standardized GSI measure is used, and a large, but insignificant effect of being in the worst 10% of mental health scores. In contrast, there is no effect of the standardized GSI measure for men, but a large significant negative effect of being in the worst 10%.

The negative relation between psychological distress and labor force participation often observed in developed countries does not consistently translate to the developing country setting. Mexican and BiH

respondents in psychological distress show no tendency to work less than others in their communities. A slight tendency is observed in Indonesia and a much greater tendency exists for women in the Indian sample.

4.2 Utilization of Health Services

Large proportions of severely mentally ill populations in the developing world receive no treatment for their disorders, suggesting widespread under-utilization and poor access. On the other hand, the situation is further complicated when patients present with primarily somatic complaints for psychiatric conditions. A study of primary care attendees in Goa revealed that 97 percent of patients presented with physical symptoms, but roughly half of those were psychiatric cases according to biomedical criteria (Patel et al., 1998). This has a direct bearing on diagnosis and treatment, because somatic symptom presentation is associated with lower recognition rates of mental disorders by primary care physicians (Paykel & Priest, 1992).

The three large scale nationally representative surveys allow us to examine the extent to which mental health status predicts usage of health facilities in the last month, after conditioning on self-reported physical health status, income, and other possible determinants of use. Panel A of Table 5 depicts the probit marginal effect when the standardized GSI is used as the measure of mental health status, while Panel B depicts the marginal effect of being in the worst 10% of mental health scores within a country.

The results suggest that individuals with poor mental health are more likely to use existing health services. This effect occurs for both men and women in all three countries, with similar-sized absolute effect across genders in Mexico, a stronger effect for males in BiH, and a stronger effect for females in Indonesia. Comparing the size of effects to the proportions using health facilities, we see quite large associations. For example, a Mexican male in the worst 10% of the mental health distribution has a 0.06 larger probability of using health facilities, which is 54 percent of the overall proportion of Mexican males using health facilities (0.11).

The common observation in both developed and developing economies that individuals with poor mental health present themselves to health facilities at high frequency, independent of their (self-assessed) physical health status, is also found in these data. This behavior may pose economic and social burdens to households with individuals in psychological distress as well as to the overall health system, especially if the underlying cause of morbidity is misdiagnosed.

5. Discussion

Household surveys in five low and middle-income countries covering Latin America, Eastern Europe, East Asia and the Pacific, and South Asia reveal significant associations between mental health scores and gender, the physical health of the respondent, his/her marital status, and the mental well-being of other members in the respondents' household and community. These relationships hold (with occasional deviations) across all the countries with roughly comparable magnitudes. In contrast, there is no consistent relationship between mental health scores and socio-economic measures such as the respondent's education or the per-capita expenditure of the household in which the respondent resides. There is evidence in some countries that lower mental health is associated with reduced labor force participation, especially for women. Mental health is also a significant predictor of health care utilization and thus perhaps burdens a health system ill-equipped to diagnose and provide care.

These results provide the setting for a discussion centered around (a) the validity of mental health modules in multi-purpose household surveys, (b) the possible use of mental health in a broader definition of welfare than traditional measures, and (c) the implications for policy and research on mental health.

5.1 Including mental health in multipurpose household surveys

Kahneman and Krueger (2006, p.7) in a review of subjective welfare measures suggest that "*the validity of subjective measures of well-being can be assessed, in part, by considering the pattern of their correlations with other characteristics of individuals and their ability to predict future outcomes*." The patterns of correlations between survey mental health measures and age, gender, widowhood, sickness, and the mental health of other family members are remarkably stable across countries and different surveying techniques. We find this to be reassuring, suggesting that survey mental health measures do indeed reflect real psychological morbidity at the individual level. Moreover, unlike other subjective measures of well-being, mental health measures have been further collaborated by studies which show that these general purpose mental health questions are strongly predictive of clinical diagnoses of depression and anxiety disorders.

Moreover, we find mental health status does help predict labor force participation and health care utilization, conditional on other socioeconomic variables typically collected in multipurpose household surveys. Furthermore, the associations between mental health scores and individual/household characteristics are very similar in surveys where questionnaires were fielded on a first visit to households and where they were fielded after a period of acquaintanceship. Finally, shorter modules (such as the GHQ-12) reveal similar associations as the longer SCL-90R, which took one hour to field for non-literate

respondents.[12] The results therefore suggest that mental health screening questionnaires can be meaningfully added to multi-purpose household surveys such as the Living Standards Measurement Surveys, and in addition to their intrinsic interest, provide additional predictive power for economic behavior beyond the physical health measures and socioeconomic variables traditionally collected.

A concern with self-reporting of physical health status is that self-reports result in measurement error which is correlated with socioeconomic characteristics, including income (see Strauss and Thomas (1998) and Lokshin and Ravallion (2007)). Strauss and Thomas note that reports of specific functionings, such as activities of daily living, are believed to be more accurate and less subject to these sources of measurement error than questions about general health status. In this regard, the questions used to construct the mental health indices, such as those about the frequency of having difficulty falling asleep, or being distracted from everyday activities, may be less prone to reporting bias than general health status.

Nevertheless, one may still be concerned about potential biases in the reporting of mental health symptoms. Sociologists and Psychologists have identified three different effects that may influence accurate reporting of internal states: (a) the overall tendency to say yes or no, (2) the need for social approval and (3) the perception of the desirability of a trait--boys don't cry, so men often do not report whether they tend to "suddenly cry without reason". Though the literature is not extensive, an early study (Gove and Geerkin 1977) suggests that these biases are uncorrelated with demographic variables such as sex, race, education, income, age, marital status and occupation--the categories examined in this paper. These results were corroborated by Vernon et al. (1982) and Hunt et al. (2003). In all 3 studies, reporting bias tends to result in underestimates of *prevalence* of psychiatric disorders such as depression, but does not alter observed correlations between mental health and demographic characteristics. One caveat is that these studies are all in high-income countries, and there so there is a need for further research on this in developing country contexts.

5.2. Mental health and welfare measurement: Going beyond measures of “happiness”

An additional motivation for including mental health measurement in household surveys is that it can allow consideration of a broader notion of welfare than is offered by the traditional focus on income and expenditure. An antecedent for this is found in the burgeoning literature on happiness and its correlates (see Kahneman and Krueger (2006) for a recent review). World Value Surveys, for instance, collect information on global life satisfaction or happiness with the single question “All things considered, how

[12] Indeed, the depression and anxiety components of the SCL-90R are found to contain most of the relevant information for the 9 dimensions covered under the questionnaire (Das and Das 2006).

satisfied you with your life as a whole these days?" An extensive literature analyses the correlates of positive reports; a natural question then, is whether information revealed through mental health questionnaires are partially orthogonal to information contained in questions on life satisfaction and happiness and hence add value in their own right.

First impressions suggest that happiness and common mental disorders have to be closely related—it seems difficult for the same person to report high levels of mental distress *and* high levels of happiness; indeed studies report a high correlation between measures of life satisfaction and measures of psychological depression (Kahneman and Krueger, 2006). However, a deeper examination of the correlates of mental health and happiness imply the need for a more nuanced explanation. The differences arise both in correlations between mental health/happiness and individual *characteristics* (age, gender, income) as well as correlations between mental health/happiness and individual's *life-events*.

The analysis in this paper reveals several areas in which the association of individual characteristics with mental health differs from the associations found in the happiness literature. We find women to generally report worse mental health than men, whereas happiness is unrelated to gender. Layard (2005), arguing for a single dimension of happiness and mental health, points out that depression is higher in women due to bio-genetic markers; yet the findings here that life events can affect male and female mental health in a differential manner (see discussion below) suggests that gender is one wedge through which we can distinguish happiness measures from mental health. Mental health almost universally worsens with age, whereas the relationship between age and happiness is complicated and highly non-linear—there is some indication that happiness is lowest in households with teenagers, at least in developed countries. The relationships are more similar when it comes to education and poverty or income. More education improves your mental health (albeit slightly) *and* makes you happier; more income does neither.

A second potential difference between mental-health and happiness is in the process of habituation and adaptation, as measured through the lens of changing life circumstances. A consistent finding in the literature on happiness is that individuals habituate or adapt to new circumstances in their lives. While changes such as marriage and recovery from illness are associated with greater happiness in the short-run, the effects vanish after a while. In this regard, the related studies in the comparative project are suggestive. In India, women who report child-loss (either through miscarriages, abortions or death) are at significantly higher risk of mental health problems compared to those without; indeed, the female mental health penalty observed in the data is entirely driven by the difference between men and women in households that experienced the loss of a child (Das and Das, 2006). In Indonesia, the mental health of the

population worsened dramatically following the economic crisis of the 1990s; however although consumption levels recovered by 2000, mental health did not (Friedman and Thomas, 2007). Additionally, as shown earlier, in all countries, poor physical health as measured through self-reported health status is strongly correlated with worse mental health.

5.3 Implications for further research on mental health and development

Effective public health policy requires an understanding of the mechanisms that determine poor mental health and, in turn, the implications of poor mental health for the individual and his/her family. The descriptive analysis here provides suggestive evidence for what some of these mechanisms may be and therefore a *potential* role for public health interventions.

The lack of any relationship between conventional economic welfare measures and mental health outcomes across a diverse sample of developing countries suggests that poverty, *per se*, is not a strong determinant of poor mental health. A straightforward equity rationale for public investments in mental health is undermined by the higher relative prevalence among the poor of other health problems such as tuberculosis and malaria as well as continuing financing gaps for these illnesses. The lack of a relationship between consumption poverty and mental health is certainly not, however, supportive of arguments that suggest no scope for public interventions towards improving mental health.

Country studies on India, Indonesia and Tonga suggest that *changes* in life-circumstances brought on by positive or negative events have relatively long-lasting implications for mental health. In addition, two of the strongest factors associated with poor mental health are poor physical health and widowhood. These findings are also consistent with studies that report worsened mental health outcomes in populations that have suffered conflict or disasters (United Nations High Commissioner for Refugees (UNHCR), 2005; Lopes Cardozo et al., 2004). The Indian and Indonesian studies suggest that the trauma from adverse events may persist long after the recovery of more traditional measures of welfare and there may very well be real individual and household costs to this persistence. Possible impacts of mental health on labor force participation and health-seeking behavior have already been discussed. Additional examples of such costs along the health dimension include: lower adherence to dietary recommendations and medication regimes among diabetics with depressive symptoms compared to diabetics without (Ciechanowski et al., 2000); high co-morbidity rates for smoking and psychiatric disorders, with smoking twice as common among the mentally ill compared to the mentally healthy population (Lasser et al., 2000); and an association between maternal mental health and child welfare in two South African studies, with maternal depression significantly increasing the odds that a child will experience growth faltering (Harpham et al.,

2005; Patel et al., 2004). Evidence of such costs in other dimensions of welfare such as education also exist (Kessler et al., 1995).

If, as the comparative research project suggests, negative shocks lead to worse mental health which in turn may decrease labor supply and increase expenditures on health care then this chain of events raises the possibility of a behavioral poverty trap. Clearly additional research is needed to better understand the causal mechanisms and dynamic phasing at play including study of the long and short-term effects of negative and positive shocks to mental health. Research into the cost-effectiveness of interventions targeted towards those in poor mental health will also shed needed light on the rationale for publicly financed mental health interventions. The clustering of mental health outcomes within households and communities raises the possibility that such treatments targeted at the level of the *household or community* may be more cost-effective than those targeted to individuals and this should be investigated.

An important limitation of this study and of the household-survey based methodology is our inability to differentiate common from severe mental disorders. Although both disorders are a cause of personal misery, a clear distinction has been remarked on in the literature, especially in the context of findings that the annual prevalence of common mental disorders exceeds 10 percent in many countries, and is as high as 16.9 percent in Lebanon, 17.8 percent in Colombia, 20.4 percent in Ukraine and 26.3 percent in the United States (WHO World Mental Health Survey Consortium, 2004). Severe mental health (such as schizophrenia), brought on by bio-genetic causes and possible interactions with environment, have much lower prevalence and require specialized studies rather than multipurpose surveys to identify as well as most likely require a separate policy response. In several low-income countries, the institutional capacity for treating such disorders is very poor with frequent human-rights violations of the severely mentally ill (WHO, 2001).

A final limitation of this study – one mentioned throughout the text – is that, in the absence of an experimental setup, the associations presented are consistent with multiple interpretations. For instance, the concordance of mental health outcomes within households could reflect unobserved household-level shocks, assortative matching (where those in poor mental health are more likely to marry each other), genetic links between parents and children, or a “contagion” effect, whereby caring for a mentally ill person in the household in turn affects the mental well being of others. Longitudinal data and experimental mental health interventions are needed to try and separate these disparate channels and to explore the link between mental health outcomes and broader measures of welfare that incorporate risk and vulnerability in their construction.

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Table 1. Overview of datasets employed

Country	Year of Survey	Number of Obs.	Level of representation	Mental health survey instrument	Mental health measure	
					Mean	Std. dev.
Bosnia	2001	12956	National	CESD	1.495	0.502
India	2003	784	7 neighborhoods in New Delhi (*)	SCL-90R	1.535	0.416
Indonesia	2000	25470	National	GHQ derived	1.413	0.508
Mexico	2002	19798	National	GHQ derived	1.341	0.358
Tonga	2005	714	Special sample of migrant sending villages	MIH-5	1.745	0.337

* Indistinguishable from a representative sample of the city

Adapted from Das et al. (2007).

Table 2: Correlates of Mental Health
(Higher score means worse mental health)

	TONGA		INDIA		MEXICO		BOSNIA		INDONESIA	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Age	0.000112	0.000635	0.00208	0.00324*	0.000656*	0.00116***	0.00442***	0.00614***	0.00152***	0.00155***
	(0.0016)	(0.0014)	(0.0019)	(0.0017)	(0.00039)	(0.00036)	(0.00069)	(0.00048)	(0.00037)	(0.00034)
Female dummy	-0.0483**	-0.0697***	0.105***	0.145***	0.156***	0.173***	0.0874***	0.147***	0.0767***	0.0837***
	(0.024)	(0.023)	(0.030)	(0.032)	(0.0066)	(0.0070)	(0.0095)	(0.0080)	(0.0073)	(0.0077)
Married dummy	0.159***	0.145***	-0.0171	-0.0484	-0.000198	0.00732	0.0736***	0.0641***	-0.0992***	-0.0910***
	(0.044)	(0.037)	(0.057)	(0.051)	(0.012)	(0.010)	(0.021)	(0.015)	(0.012)	(0.011)
Widowed dummy	0.128	0.183**	-0.120	-0.170*	0.0583***	0.0626***	0.116***	0.133***	0.0465**	0.0452**
	(0.090)	(0.082)	(0.11)	(0.096)	(0.019)	(0.018)	(0.037)	(0.026)	(0.023)	(0.021)
Years of Education	0.00418	0.00493			-0.00951***	-0.00653***	-0.0104***	-0.00496***	-0.00140	-0.00135
	(0.0039)	(0.0032)			(0.0012)	(0.0011)	(0.0016)	(0.00080)	(0.0011)	(0.00093)
Primary to high school			-0.0836**	-0.0720**						
			(0.039)	(0.035)						
High school or more			-0.153***	-0.109**						
			(0.051)	(0.043)						
Log HH Consumption per capita	-0.0438**	-0.0192**	0.0485	0.0281	0.000169	0.00502	-0.0853***	-0.0139***	0.00873	0.00541
	(0.017)	(0.0076)	(0.033)	(0.021)	(0.0054)	(0.0043)	(0.015)	(0.0053)	(0.0065)	(0.0048)
Household Size	-0.0122*	-0.00141	0.0156	0.00968	0.00113	0.000610	-0.0314***	-0.00564*	0.00186	-0.0000531
	(0.0070)	(0.0034)	(0.012)	(0.0070)	(0.0026)	(0.0020)	(0.0077)	(0.0030)	(0.0018)	(0.0012)
Poor physical health			0.236***	0.189***	0.379***	0.339***	0.723***	0.528***	0.378***	0.337***
			(0.058)	(0.050)	(0.021)	(0.021)	(0.097)	(0.059)	(0.015)	(0.014)
Elderly dependents	-0.280**	-0.175***	-0.187	-0.169*	0.0282	-0.0205	-0.0919**	-0.174***	0.0398	0.0176
	(0.11)	(0.060)	(0.16)	(0.098)	(0.023)	(0.019)	(0.038)	(0.018)	(0.029)	(0.022)
Young dependents	-0.255***	-0.192***	0.00626	0.00729	0.0572**	0.0273	-0.0920	-0.0358	0.0516**	0.0448**
	(0.098)	(0.049)	(0.10)	(0.070)	(0.023)	(0.018)	(0.059)	(0.023)	(0.026)	(0.019)
Household mental health		0.592***		0.404***		0.222***		0.544***		0.364***
		(0.045)		(0.067)		(0.017)		(0.020)		(0.022)
Community mental health						0.517***		0.354***		0.707***
						(0.042)		(0.020)		(0.039)
Constant	1.954***	0.730***	1.051***	0.968***	1.245***	0.187***	1.833***	-0.0904**	1.190***	-0.116
	(0.096)	(0.11)	(0.26)	(0.17)	(0.043)	(0.068)	(0.098)	(0.042)	(0.078)	(0.073)
Observations	685	685	738	738	17905	17905	11870	11870	19697	19697
R-squared	0.10	0.32	0.08	0.18	0.14	0.20	0.22	0.61	0.09	0.15

Robust standard errors in parentheses clustered at the household level. The widowed dummy also includes those separated and divorced. Elderly dependents refers to the number of household members greater than 60 years of age while young dependents refers to the number of members 15 years and younger.

*** p<0.01, ** p<0.05, * p<0.1

Table 3: Correlates of Severe Mental Health
Marginal Effects from Probit Estimation of being in the worst 10% or worst 5% of mental health scores

	TONGA	INDIA	MEXICO		BOSNIA		INDONESIA	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Worst 10%	Worst 10%	Worst 10%	Worst 5%	Worst 10%	Worst 5%	Worst 10%	Worst 5%
Age	0.0000921	0.000986	0.000522**	0.0000575	0.000783***	0.000298***	0.000688***	0.000137
	(0.0013)	(0.0010)	(0.00026)	(0.00020)	(0.00018)	(0.000063)	(0.00021)	(0.00014)
Female dummy	0.0000756	0.0437**	0.0789***	0.0443***	0.0260***	0.00731***	0.0306***	0.0150***
	(0.026)	(0.021)	(0.0057)	(0.0043)	(0.0043)	(0.0018)	(0.0049)	(0.0032)
Married dummy	0.0846***	0.0121	0.0122	0.00654	0.0206***	0.00294	-0.0514***	-0.0131**
	(0.032)	(0.033)	(0.0075)	(0.0059)	(0.0053)	(0.0019)	(0.0083)	(0.0052)
Widowed dummy	0.125	-0.0472	0.0335**	0.0246*	0.0896***	0.00832	0.00519	0.0215**
	(0.15)	(0.034)	(0.016)	(0.013)	(0.033)	(0.0067)	(0.012)	(0.0097)
Years of Education	-0.00182		-0.00435***	-0.00308***	-0.000773**	-0.000270**	-0.000558	-0.000528
	(0.0034)		(0.00081)	(0.00061)	(0.00027)	(0.00012)	(0.00063)	(0.00039)
Primary to high school		-0.0258						
		(0.024)						
High school or more		-0.0372						
		(0.024)						
Log HH Consumption per capita	0.000774	0.00228	0.0000798	0.00135	-0.00464**	-0.00148*	0.000546	-0.00441**
	(0.0093)	(0.014)	(0.0030)	(0.0023)	(0.0022)	(0.00088)	(0.0032)	(0.0021)
Household Size	0.00774**	0.00764*	0.000174	-0.000830	-0.00148	-0.000405	0.000353	-0.000671
	(0.0038)	(0.0046)	(0.0014)	(0.0012)	(0.0011)	(0.00052)	(0.00085)	(0.00055)
Poor physical health		0.0961**	0.181***	0.124***	0.155***	0.0959***	0.175***	0.102***
		(0.044)	(0.019)	(0.017)	(0.034)	(0.022)	(0.010)	(0.0076)
Old dependents	-0.0492	-0.0182	-0.00969	-0.00225	-0.0201***	-0.0100***	-0.000732	0.000631
	(0.086)	(0.060)	(0.015)	(0.0100)	(0.0070)	(0.0027)	(0.015)	(0.0094)
Young dependents	-0.124**	-0.0827	0.0141	0.00341	-0.0120	-0.00827*	0.0358***	0.00922
	(0.055)	(0.052)	(0.014)	(0.011)	(0.011)	(0.0046)	(0.013)	(0.0085)
Household mental health	0.414***	0.140***	0.0805***	0.0473***	0.0653***	0.0196***	0.138***	0.0637***
	(0.043)	(0.028)	(0.0085)	(0.0060)	(0.0055)	(0.0025)	(0.0096)	(0.0058)
Community mental health			0.182***	0.113***	0.0549***	0.0116***	0.267***	0.124***
			(0.027)	(0.019)	(0.0077)	(0.0031)	(0.026)	(0.016)
Observations	685	738	17905	17905	11870	11870	19697	19697

Note: marginal effects are the change in probability associated with a discrete change in dummy variables from 0 to 1 and with an infinitesimal change in continuous variables. Robust standard errors in parentheses clustered at the household level. The widowed dummy also includes those separated and divorced. Elderly dependents refers to the number of household members greater than 60 years of age while young dependents refers to the number of members 15 years and younger.
*** p<0.01, ** p<0.05, * p<0.1

Table 4: Impact of Mental Health on Labor Force Participation

Marginal effects from probit estimation (18 to 60 year olds)

	TONGA		INDIA		MEXICO		BOSNIA		INDONESIA	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Panel A										
standardized mental health index	0.00765	-0.0863***	0.00910	-0.0462*	0.000961	-0.00455	0.0192	0.0183	-0.0173***	-0.0130**
	(0.028)	(0.029)	(0.022)	(0.026)	(0.0052)	(0.0074)	(0.015)	(0.013)	(0.0043)	(0.0056)
Panel B										
Dummy for being in worst 10%	-0.2090**	-0.1077	-.0317	-0.1769**	0.011	-0.017	-0.0362	0.0042	-0.0508***	-0.0463**
	(0.097)	(0.131)	(0.079)	(0.061)	(0.017)	(0.023)	(0.062)	(0.046)	(0.019)	(0.019)
Labor Force Participation Rate	0.59	0.37	0.84	0.30	0.89	0.38	0.73	0.43	0.83	0.50
Observations	299	320	334	345	6665	8675	4597	4980	9626	10742

Note: marginal effects are the change in probability associated with a discrete change in dummy variables from 0 to 1 and with an infinitesimal change in continuous variables.

Probits also include age, marital status, education, household size, elderly and young dependents, and physical health status.

Robust standard errors in parentheses clustered at the household level

*** p<0.01, ** p<0.05, * p<0.1

Table 5: Impact of Mental Health on Health Facility Utilization

Marginal effects from probit estimation

	MEXICO		BOSNIA		INDONESIA	
	Men	Women	Men	Women	Men	Women
Panel A						
standardized mental health index	0.0347***	0.0473***	0.0826***	0.0573***	0.00566***	0.0127***
	(0.0053)	(0.0053)	(0.0093)	(0.0085)	(0.0021)	(0.0022)
Panel B						
Dummy for being in worst 10%	0.0653**	0.0889***	0.272***	0.0752**	0.00991	0.0247***
	(0.026)	(0.019)	(0.051)	(0.029)	(0.0085)	(0.0092)
Proportion using a health facility in the last month	0.111	0.211	0.204	0.262	0.050	0.076
Observations	8538	10720	6007	6794	11948	13296

Note: marginal effects are the change in probability associated with a discrete change in dummy variables from 0 to 1 and with an infinitesimal change in continuous variables.
Probits also include age, marital status, education, household size, elderly and young dependents, physical health status and log household consumption or income per capita.
Robust standard errors in parentheses clustered at the household level.
*** p<0.01, ** p<0.05, * p<0.1